

**Louisiana Department of Environmental Quality (LDEQ)
Office of Environmental Services**

STATEMENT OF BASIS

Chalmette Refining, L.L.C.
Fluidized Catalytic Cracking Unit and Alkylation Unit
Chalmette, St. Bernard Parish, Louisiana
Agency Interest Number: 1376
Activity Number: PER20070008 and PER20070009
Draft Permit 3022-V1 and PSD-LA-199(M-6)

I. *APPLICANT:*

Company:

Chalmette Refining, L.L.C.
Post Office Box 1007
Chalmette, Louisiana 70044

Facility:

Chalmette Refining, L.L.C – Chalmette Refinery
Fluidized Catalytic Cracking Unit and Alkylation Unit
500 W. St. Bernard Highway, Chalmette, St. Bernard Parish, Louisiana
Approximate UTM coordinates are 792.12 kilometers East and 3341.95 kilometers North, Zone 15

Responsible Official:

Mr. J.A. Stroink, Refinery Manager

II. *FACILITY AND CURRENT PERMIT STATUS*

Chalmette Refinery, L.L.C. (CRLLC) operates an oil refinery in Chalmette, Louisiana, in St. Bernard Parish. St. Bernard Parish is currently designated as attainment for all regulated air pollutants. The Utilities Plant are a major source subject to the Part 70 operating permit program because it is part of a stationary source that has the potential to emit over the major source emissions levels for criteria pollutants. In addition, this stationary source has the potential to emit 25 or more tons per year of aggregate TAPs.

The Chalmette Refinery is bordered by the Mississippi River to the south, Calciner Industries, Inc. and old Kaiser Aluminum Company to the west, St. Bernard Highway with light commercial and residential areas to the north and Palmisano Street with light commercial and residential areas to the east. Chalmette Refinery is a joint venture between ExxonMobil Corporation and Petroleos de Venezuela (PDV), the Venezuelan national oil company. The refinery is an integrated crude operation (high conversion) which includes crude distillation, catalytic reforming, fluid catalytic cracking (FCC), hydrocracking, HF alkylation, delayed coking, and aromatics processing units. The refinery's product capabilities include gasoline, diesel, benzene/toluene/xylene (BTX) production, distillates, and sulfur recovery as well as by-products such as petroleum coke and LPG. Currently the Fluidized Catalytic Cracking Unit and the Alkylation Unit are operated under a Part 70 Permit No. 3022-V0 dated January 30, 2007.

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The Fluidized Catalytic Cracking Unit (FCCU) & Alkylation Unit are used to upgrade the feed by cracking or breaking heavy hydrocarbon molecules into lighter and desirable hydrocarbon molecules suitable for use in motor gasoline or diesel blending and combine low molecular weight olefins with isobutene to produce gasoline components (alkylates) of higher octane rating. Chalmette Refining, L.L.C. now proposes to undertake Thermal De-NOx Project as per the requirements of U.S. EPA Consent Decree, a NSR Global Settlement (Civil Action No. 05-4662 B(i)) between U.S. EPA and State of Louisiana verses Chalmette Refining, L.L.C. filed on April 26, 2006, to reduce NOx emissions from the FCCU. This project is independent of the previous Oxygen Enrichment Project approved in the current Part 70 Permit No. 3022-V0 dated January 30, 2007.

The process units that exist at the Chalmette Refinery site include Oil Movements and Loading; Utilities Plant; Waste Water Treatment Plant; No. 1 Crude/Coker; No. 2 Crude/Coker; Cat Feed Hydrotreater/Pretreater No. 1/Reformer No. 1/Gasoline Hydrotreater Unit; Sulfur Recovery Unit/HDS/AMU/SWS/WGS/BRU; Flare No.1 & Flare No. 2; Hydrocracker Unit/Pretreater No. 3/Reformer No. 3/LEP; Fluidized Catalytic Cracking Unit/Alkylation; and Aromatics.

The entire facility is operating under several Part 70 permits as shown below:

<u>Permit #</u>	<u>Units or Sources</u>	<u>Date Issued</u>
2500-00005-V0	Utilities Plant	11/07/2005
2822-V0	Wastewater Treatment Plant	3/14/2006
3004-V0	Oil Movements & Loading	1/30/2007
3015-V0	HCU, PR3, RF3, LEP	1/30/2007
3016-V0	Flare No. 1 & 2	1/30/2007
3017-V0	Aromatics	1/30/2007
2933-V0	Crude 2/Coker 2	3/14/2006
3011-V0	CFHT, PR1, RF1, GHT	1/30/2007
3018-V0	Crude 1/Coker 1	1/30/2007
3023-V0	SRU	1/30/2007

III. **PROPOSED PERMIT / PROJECT INFORMATION**

Proposed Permit

An application and Emission Inventory Questionnaires (EIQ), were submitted by Chalmette Refining, L.L.C on April 4, 2007 for a modification of Part 70 Permit No. 3022-V0 and the PSD Permit No. PSD-LA-199(M-5). Additional information as of August 13, 2007 was also received.

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Project description

Chalmette Refining, L.L.C, Chalmette Refinery, now proposes to undertake Thermal De-NO_x Project as per the requirements of U.S. EPA Consent Decree, a NSR Global Settlement (Civil Action No. 05-4662 B(i)) between U.S. EPA and State of Louisiana verses Chalmette Refining, L.L.C. filed on April 26, 2006, to reduce NO_x emissions from the FCCU. This project is independent of the previous Oxygen Enrichment Project approved in the current Part 70 Permit No. 3022-V0 dated January 30, 2007.

The Thermal De-NO_x is a selective non-catalytic reduction process that will be custom designed to reduce approximately 225 tons per year of NO_x emissions from the FCCU (difference between "Before" and "After" permit limits). In this process aqueous ammonia and hydrogen along with steam are injected into the FCC Regenerator flue gas at appropriate locations. The ammonia and hydrogen react with the flue gas reducing NO_x to form nitrogen and water vapor. The NO_x reduction efficiency depends on the amount of hydrogen injected, the flue gas temperature, the residence time, and the NO_x concentration in flue gas.

In order to achieve this goal Chalmette Refinery will install new equipment and several existing equipment will be modified or affected as appropriate. New equipment include an aqueous ammonia (29 wt %) storage tank, rail tank car and truck loading racks for ammonia, truck loading racks for hydrogen, equipment to load CO Promoter to the system and to handle catalyst, associated fugitive equipment (pumps, piping, process analyzers, control valves, and instrumentation). Additional steam demand will be approximately 35,000 lb/hr and hydrogen demand will be 35,000 scf/hr. The steam will be supplied by the refinery and the hydrogen will be supplied by the refinery or purchased. The upstream and downstream operations will not be affected. There will be a substantial increase in CO emissions of approximately 450 tons per year and an increase in NH₃ emissions of approximately 15 tons per year (both collateral increases) due to the Thermal De-NO_x Project. The facility will also update Insignificant Activities and General Condition XVII lists based on the recent comprehensive review of refinery operations.

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The Thermal De-NOx Project emissions increases/decrease in tons per year is as follows:

<u>Pollutant</u>	<u>2005/2006 Average</u> <u>Emissions (a)</u>	<u>Post Thermal De-NOx</u> <u>Project Emissions(b)</u>	<u>Incremental</u> <u>Emissions(c)</u>	<u>Total Emissions</u> <u>Increase (d)</u>	<u>Change</u>
PM ₁₀	87.90	73.40	1.80	75.20	- 12.70
SO ₂	30.10	53.80	3.50	57.30	+ 27.20
NO _x	246.90	160.50	34.20	194.70	- 52.20
CO	209.40	732.80	25.10	757.90	+ 548.50
VOC	2.60	3.70	1.30	5.00	2.40

$d = (b+c)$ and $\text{Change} = (d - a)$

Prevention of Significant Deterioration review is required as the total estimated emissions increase of CO is greater than the PSD significance level of 100 tons per year; therefore, netting is required. There are no contemporaneous emissions increases or decreases within the contemporaneous period of First Quarter of 2003 to Fourth Quarter of 2008; therefore, a PSD review is required for the Thermal De-NOx Project as the increase in CO emissions is greater than 100 tons per year. Under the Best Available Control Technology (BACT) requirements the CO emissions will be controlled by adopting good engineering practices and operating the FCCU in full-burn mode. The CO emissions will be limited to less than or equal to 500 ppmv at 0% oxygen on a hourly average basis and 300 ppmv at 0% oxygen on a rolling 365-day average. There will be some increase in emissions due to the catalyst storage and loading/unloading which do not require any BACT controls.

IV. REGULATORY ANALYSIS

The applicability of the appropriate regulations is straightforward and is provided in the Facility Specific Requirements Section of the proposed permit. Similarly, the Monitoring, Reporting and Recordkeeping necessary to demonstrate compliance with the applicable terms conditions and standards are provided in the Facility Specific Requirements Section of the proposed permit.

National Emission Standards for Hazardous Air Pollutants: NESHAP From Benzene Waste Operations (BWON)

Chemical manufacturing plants, coke by-product plant and petroleum refineries are

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potentially subject to the provisions of BWON. Oil water separators, individual drain systems, stream stripping units, and other equipment that meet the definition of a waste management unit are subject to BWON. A waste management unit is defined as a piece of equipment used in the handling, storage, treatment, or disposal of waste. A waste is any material resulting from industrial operations that is discarded or accumulated, stored, or treated prior to discarded, recycled, or discharged. BWON specifically lists the following waste streams to which this regulation do not apply: 1) Waste in the form of gases or vapors that is emitted from process fluids; 2) Waste that is contained in a segregated storm water sewer system; and 3) Any gaseous stream from a waste management unit, treatment process, or wastewater treatment system routed to a fuel gas system.

The facility generates a total annual benzene (TAB) quantity of 10 megagrams per year or greater. The facility elects to take the 6 megagrams per year option as per the requirements of 40 CFR 63.342(e) where the total uncontrolled benzene quantity for the wastes shall not be greater than 6 megagrams per year.

National Emission Standards for Hazardous Air Pollutants: NESHAP From Synthetic Organic Chemical Manufacturing Industry

A chemical manufacturing process unit (CMPU) that manufactured one or more SOCM chemicals listed in Table 1 of 40 CFR 63, Subpart F and that uses as a reactant or manufactures as a product, or co-product, one or more of the organic hazardous air pollutants listed in Table 2 of 40 CFR 63, Subpart F is potentially subject to the SOCM HON. Some of the Chemical Manufacturing Process Units (CMPUs), located elsewhere in the refinery, may generate maintenance wastewater and Group 2 process wastewater and route it to the WWTP. Therefore, the WWTP is subject to Subpart F Maintenance Wastewater requirements and Subpart G Group 2 Process Wastewater requirements.

National Emission Standards for Hazardous Air Pollutants: NESHAP From Petroleum Refineries

A petroleum refining process unit that contains or contacts one or more of the HAPs listed in Table 1 of Subpart CC is potentially subject to RMACT.

There are fugitive components within the CFHT-PT1-RF1-GHU units in organic HAP service. Therefore, the units are subject to the equipment leak provisions of this rule and CRLLC demonstrates compliance by complying with the provisions of 40 CFR 63.648(c), the modified HON option.

A process wastewater stream in a refining process unit that contains one or more of the HAPs listed in Table 1 of Subpart CC are potentially subject to RMACT. Wastewater components within the process units are associated with petroleum refining process units. Therefore, the wastewater provisions of the RMACT are applicable. Group 2 streams are not subject to any control, monitoring, recordkeeping, or reporting requirements under

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RMACT. Group 1 wastewater streams must demonstrate compliance with RMACT by complying with NESHAP Part 61 Subpart FF, BWON.

The CFHT-PT1-RF1-GHU units contain tanks that receive maintenance wastewater and wastewater streams that are subject to the wastewater provisions of RMACT. When determining whether a tank must comply with the storage vessel provisions or the wastewater provisions of the RMACT, the function of the tank (whether the tank stores a waste or a product for use or reuse) is used as the basis of the determination. As defined in RMACT Subpart CC, a wastewater tank is not a storage vessel. Notably, the CFHT-PT1-RF1-GHU units contain Group 2 wastewater tanks. Group 2 wastewater tanks are not subject to any control, monitoring, recordkeeping, or reporting requirements under RMACT.

The No. 1 Crude Unit contains tanks that receive maintenance wastewater and wastewater streams that are subject to the wastewater provisions of RMACT. When determining whether a tank must comply with the storage vessel provisions or the wastewater provisions of the RMACT, the function of the tank (whether the tank stores a waste or a product for use or reuse) is used as the basis of the determination. As defined in RMACT Subpart CC, a wastewater tank is not a storage vessel. Notably, the No. 1 Coker Unit contains Group 2 wastewater tanks. Group 2 wastewater tanks are not subject to any control, monitoring, recordkeeping, or reporting requirements under RMACT.

National Emission Standards for Hazardous Air Pollutants: NESHAP From Synthetic Organic Chemical Manufacturing Industry

The petroleum refining process unit that contains or contacts one or more of the HAPs listed in Table 1 of Subpart CC is potentially subject to RMACT. Leaks from equipment in organic HAP service that are located in a petroleum refining process unit are subject to RMACT. Equipment in organic HAP service in the WWTP Area is subject to the RMACT. CRLLC demonstrates compliance with this rule by complying with the provisions of 40 CFR 63.648. A process wastewater stream in a petroleum refining process unit that contains one or more of the HAPs listed in Table 1 of Subpart CC are potentially subject to RMACT. The WWTP receives process wastewater streams and, therefore, the wastewater provisions of the RMACT are applicable to the WWTP Area.

Notably, the benzene concentration of the wastewater streams generated in the WWTP Areas is less than 10 ppmw. Therefore, the wastewater stream can be classified as a Group 2 stream. There are no controls, monitoring, recordkeeping, or reporting requirements for Group 2 wastewater streams. However, the Vacuum Trucks within the WWTP may load and transport process wastewater streams from refinery units that can be classified as Group 1 streams. Per 40 CFR 63.647(a), Group 1 wastewater streams

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must demonstrate compliance with RMACT by complying with NESHAP Part 61 Subpart FF, BWON.

The WWTP area contains tanks that receive maintenance wastewater and wastewater streams that are subject to the wastewater provisions of RMACT. When determining whether a tank must comply with the storage vessel provisions or the wastewater provisions of the RMACT, the function of the tank (whether the tank stores a waste or a product for use or reuse) is used as the basis of the determination. As defined in RMACT Subpart CC, a wastewater tank is not a storage vessel. Notable, the WWTP area contains Group 2 wastewater tanks. Group 2 wastewater tanks are not subject to any requirements under RMACT.

The equipment leak provisions of Subpart CC apply to all equipment that operates in organic HAP service. Equipment includes all pumps, compressors, pressure relief devices, sampling connections, open-ended valves or lines, valves, flanges and other connectors, product accumulator vessels, and control devices, or systems required by Subpart CC. However, there are no fugitive components within the WWTP Area in organic HAP service. Therefore, the WWTP Area is not subject to the equipment leak provisions of this rule.

Prevention of Significant Deterioration Applicability

Prevention of Significant Deterioration (PSD) review is required as the total estimated emissions increase of CO for the Thermal De-NO_x Project is greater than the PSD significance level. For the details refer to Part 70 Permit No. 3022-V1 and PSD Permit No. PSD-LA-199(M-6).

TABLE III: SUMMARY OF PROPOSED BACT		
Source Description	Pollutant	Most Feasible BACT Selected
Thermal De-NO _x Project (Add on control)	CO	Good Combustion Practices along with Full-Burn Mode
		300 ppmv at 0% oxygen on a 365-day rolling average
		500 ppmv at 0% oxygen on a one hour average

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Air Modeling Analysis

Air modeling indicated that the National Ambient Air Quality Standards for CO were not exceeded. See PSD Permit No. PSD-LA-199(M-6) for details.

Breton National Wildlife Area, the nearest Class I area, is approximately 91.7 kilometers from the Chalmette Refinery site. Federal Land Managers (FLM) has developed some internal screening criteria using a "Q/d" approach. Q/d refers to the ratio of the sum of annual emissions (in tons per year) of PM₁₀, SO₂, NO_x, and H₂SO₄ to the distance (in kilometers) from the nearest boundary of the Class I area. If Q/d ≥ 4, the applicant should contact the FLM.

$$Q/d = \frac{PM_{10} (NEI) + SO_2 (NEI) + NO_x (NEI) + H_2SO_4 (NEI)}{\text{Class I km}}$$

$$Q/d = \frac{0 + 27.2 + 0 + 0}{91.7}$$

$$Q/d = 0.3$$

NEI – Net Emissions Increase

The result of Q/d is less than 4. Notification of FLM is not required. It can be safely inferred based on the Q/d analysis that there will not be any impact on the Class I area.

Comprehensive Toxic Air Pollutant Control Program-Chapter 51

Toxic air pollutant emissions from fugitives must be controlled to a degree that constitutes MACT. The units comply with all applicable provisions of the Louisiana Air Toxics Program (LAC 33:III.Chapter 51).

Maximum Achievable Control Technology (MACT) requirements

The Louisiana Air Toxics Program (LA MACT) requires a major source emitting any Class I or II pollutant at a rate that exceeds the minimum emission rate for that pollutant to demonstrate compliance with the Maximum Achievable Control Technology (MACT) standards. Additionally, the Louisiana Air Toxics Program requires a major source emitting any Class I, II, or III toxic air pollutant greater than the minimum emission rate for that pollutant to determine its status of compliance with the applicable ambient air standard (AAS) defined for the pollutant.

The requirements of the LA MACT apply to the storage tanks and to the units as a whole. Chalmette Refining demonstrates compliance with the LA MACT requirements by

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complying with the most stringent applicable federal or state air toxics regulations.

General Condition XVII Activities

The facility will comply with the applicable General Condition XVII Activities emissions as required by the operating permit rule. However, General Condition XVII Activities are not subject to testing, monitoring, reporting or recordkeeping requirements. For a list of approved General Condition XVII Activities, refer to Section VIII of the proposed Part 70 permit.

Insignificant Activities

All Insignificant Activities are authorized under LAC 33:III.501.B.5. For a list of approved Insignificant Activities, refer to Section IX of the proposed Part 70 permit.

V. *PERMIT SHIELDS*

A permit shield was not requested.

VI. *PERIODIC MONITORING*

The Monitoring, Reporting and Recordkeeping necessary to demonstrate compliance with the applicable terms, conditions and standards are provided in the Facility Specific Requirements Section of the proposed permit, Permit No. 3022-V1.

The facility will install Continuous Monitoring System (CEMS) to predict CO emissions from the FCCU.

VII. *APPLICABILITY AND EXEMPTIONS OF SELECTED SUBJECT ITEMS*

See Proposed Permit.

VIII. *STREAMLINED REQUIREMENTS*

This proposed permit does not include any streamlined requirements.

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IX. GLOSSARY

Carbon Monoxide (CO) – A colorless, odorless gas which is an oxide of carbon.

Maximum Achievable Control Technology (MACT) - The maximum degree of reduction in emissions of each air pollutant subject to LAC 33:III.Chapter 51 (including a prohibition on such emissions, where achievable) that the administrative authority, upon review of submitted MACT compliance plans and other relevant information and taking into consideration the cost of achieving such emission reduction, as well as any non-air-quality health and environmental impacts and energy requirements, determines is achievable through application of measures, processes, methods, systems, or techniques.

New Source Review (NSR) - A preconstruction review and permitting program applicable to new or modified major stationary sources of air pollutants regulated under the Clean Air Act (CAA). NSR is required by Parts C ("Prevention of Significant Deterioration of Air Quality") and D ("Nonattainment New Source Review").

Nitrogen Oxides (NO_x) - Compounds whose molecules consists of nitrogen and oxygen.

Organic Compound - Any compound of carbon and another element. Examples: Methane (CH₄), Ethane (C₂H₆), Carbon Disulfide (CS₂)

Part 70 Operating Permit- Also referred to as a Title V permit, required for major sources as defined in 40 CFR 70 and LAC 33:III.507. Major sources include, but are not limited to, sources which have the potential to emit: ≥ 10 tons per year of any toxic air pollutant; ≥ 25 tons of total toxic air pollutants; and ≥ 100 tons per year of regulated pollutants (unless regulated solely under 112(r) of the Clean Air Act) (25 tons per year for sources in non-attainment parishes).

PM₁₀- Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by the method in Title 40, Code of Federal Regulations, Part 50, Appendix J.

Potential to Emit (PTE) - The maximum capacity of a stationary source to emit any air pollutant under its physical and operational design.

Prevention of Significant Deterioration (PSD) – A New Source Review permitting program for major sources in geographic areas that meet the National Ambient Air

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Quality Standards (NAAQS) at 40 CFR Part 50. PSD requirements are designed to ensure that the air quality in attainment areas will not degrade.

RMACT – Refinery Maximum Achievable Control Technology

Sulfur Dioxide (SO₂) – An oxide of sulfur.

Title V permit – See Part 70 Operating Permit.

Volatile Organic Compound (VOC) - Any organic compound which participates in atmospheric photochemical reactions; that is, any organic compound other than those which the administrator of the U.S. Environmental Protection Agency designates as having negligible photochemical reactivity.